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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/808,692	03/25/2004	Tsutomu Ogihara	035576/276101	6062

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EXAMINER	
SARKAR, ASOK K	
ART UNIT	**PAPER NUMBER**
2891	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/31/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/808,692	OGIHARA ET AL.	
	Examiner	Art Unit	
	Asok K. Sarkar	2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) *6-12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 13-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1 – 5 and 13 – 15 rejected under 35 U. S.C. 102(e) and 103(a) as being unpatentable for reasons of record in Office Action mailed September 8, 2006 is reproduced below:

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1 – 4 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Watanabe, US 6,632,489.

Regarding claims 1 and 15, Watanabe teaches a composition for forming a porous film comprising a condensation product and an organic solvent (column 6, lines 45 – 61) wherein the condensation product is obtained by condensation, in the presence of acid, of at least one compound selected from a silicate represented by formula (1)

$$(X_2O)_i (SiO_2)_j (H_2O)_k \qquad (1)$$

wherein X independently represents Na, or quaternary ammonium (in between column 8, line 50 and column 9, line 7) , i, j and k independently represent numbers which satisfy $0< i <1$, $0< j <1$ and $0 < k < 2$ in between column 6, line 30 and column 9, line 7.

The silica sol produced is in the form of liquid and can be used for coating purposes (column 4, lines 1 – 6). The condensation of the silicates in acidic solution is inherent in the process of Watanabe.

Regarding claims 2 – 4, Watanabe teaches mixing water soluble silicate such quaternary ammonium silicates to the silica sol prepared by mixing alkali silicate with acidic solution in between column 8, line 50 and column 9, line 7. The presence of the acid will hydrolyze the quaternary ammonium silicate to form the condensation product; which is ultimately converted into the silica sol containing silica particles.

The quaternary ammonium silicates contains alkyl group that has 1 – 20 carbons and is tetramethyl ammonium silicate.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe, US 6,632,489 in view of Nishiyama, US 2004/0155053.

Watanabe teaches forming the film from a coating composition but fails to teach drying and heating the film.

Nishiyama teaches forming porous film by applying the composition on a substrate, drying and heating the film in paragraphs 25 and 32 – 35 for the benefit of deposition on a substrate in paragraph 19.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Watanabe and form the film from the coating composition by drying and heating the film for the benefit of deposition on a substrate as taught by Nishiyama in paragraph 19.

8. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe, US 6,632,489 in view of Mandal, US 6,576,568.

Regarding these claims, Watanabe fails to teach the modulus of elasticity and

the dielectric constant.

Mandal teaches that the porous films formed from the silica sol have modulus of elasticity between 5 – 50 GPa and the dielectric constant of 2.3 or less in between column 6, line 58 and column 7, line 10 for the benefit of providing a premetal or intermatal dielectric film in column 1, lines 12 – 16. The porous silica film formed by Mandal is similar to Watanabe because it is formed by adding tetramethyl ammonium salts to the acid solution containing the silica gel (see example 1 in column 10).

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention of Watanabe that porous films obtained by the sol – gel process can be customized to have modulus of elasticity between 5 – 50 GPa and the dielectric constant of 2.3 or less for the benefit of providing a premetal or intermatal dielectric film as taught by Mandal in column 1, lines 12 – 16.

Response to Arguments

9. Applicant's arguments filed December 7, 2006 have been fully considered but they are not persuasive. The Applicant alleges that in the description of the four – step process (steps a – d) by Watanabe, the dehydration – condensation reaction is performed in the presence of a neutral to basic solution. The Applicant cites the steps from Watanabe in their remarks on pages 2 – 3. This argument is not persuasive due to the following reason.

Watanabe teaches in step (b) (see column 4, beginning on line 49) adding an acidic silica sol having a pH of 2 – 6 to the solution prepared in step (a). This solution is still acidic or in other words acid is present in the solution. Then, in step (c), water –

soluble silicates are added to it. The addition of alkali silicates increases the pH to 11, which is then heated for the dehydration – condensation. Thus, in the absence of any other claim limitations, Watanabe teaches a composition comprising a condensation product and an organic solvent wherein the condensation product is obtained by condensation of an alkali silicate in the presence of acid. Therefore, Watanabe anticipated the claims 1 – 4 and 15. According to the limitations of claim 1, the composition is a condensation product carried out by reacting an alkali silicate in the presence of acid and an organic solvent. Watanabe teaches all limitations as explained earlier in the rejection of these claims.

The Applicant's additional arguments (pages 3 – 6) pertain to the dependent claims 2, 3 and 4. The Applicant argues that the claims that these claims are patentable in view of their argument with respect to the teachings of Watanabe. However, as shown previously, this is not the case since Watanabe teaches that the condensation product is obtained by condensation of an alkali silicate in the presence of acid.

The Applicant's assertion regarding claims 13 and 14 is also not persuasive. The Applicant alleges that Mandal advocated alkali – free mixture and uses a surfactant. Regarding the alkali, it is pointed out that Watanabe also uses water soluble organic bases which are free of alkali metals (see column 8, lines 63 – 68). Furthermore, the elastic modulus of a film is mostly affected by the composition of the silicate materials and not the surfactants, since the surfactants have very small effect on the modulus values. The Applicant's mention of the passages in Mandal's column 5, line 66 through

column 6, line 3 in first paragraph of page 4 is directed to stabilize the porosity of the film in a controlled manner to produce low dielectric constant. However, low dielectric constant can also be obtained from the pores generated by driving off the water molecules from the film while drying and heating.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 571 272 1970. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William B. Baumeister can be reached on 571 272 1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Asok Kumar Sarkar

Asok K. Sarkar
January 29, 2007

Primary Examiner